PowerEdge M610

Technical Guide

The Dell PowerEdge M610 blade server helps cut operating expenses through energy efficiency, product flexibility, and efficient use of data center space.

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1 Product Comparison

1.1 Overview

The Dell™ PowerEdge™ M610 is a half-height blade server which offers a robust and scalable enterprise platform that can help you simplify and save on IT expenses.

1.1.1 Strong IT Foundation

To build the most efficient data center solutions, Dell sought input from IT professionals. You asked for reliability, scalability, energy efficiency, and a lower total cost of ownership (TCO). Our M610 blade servers deliver, becoming the cornerstone of a high-performance data center capable of keeping pace with your changing business demands.

1.1.2 Purposeful Design

Designed with your needs in mind, the M610 uses the Intel® Xeon® processor 5500 and 5600 series. These processors adapt to your software in real time, processing more tasks simultaneously. Using Intel® Turbo Boost Technology, the M-Series blades can increase performance during peak usage periods. When demand decreases, Intel® Intelligent Power Technology helps reduce operating costs and energy usage by proactively putting your server into lower power states.

The M610 delivers quick virtualization with software from leading industry vendors by offering optional integrated SD storage or internal USB for embedded hypervisors, and includes the features necessary to meet the demands for performance, high availability and redundancy in modern data centers, such as a large memory capacity of up to 192 GB of total RAM.

1.1.3 Scalability for Growth

As your application needs increase, M610 blades allow you to scale up to 192 cores and 3072 GB of memory per 10U chassis, with opportunities for even greater capacities in the future.

To keep pace with changing requirements, you can effectively scale I/O application bandwidth with end-to-end 10 Gbe or Fibre Channel solutions. Use NPIV and Port Aggregator modes on a variety of switches to virtualize Ethernet or Fibre Channel ports for integration into heterogeneous fabrics. By harnessing Dell's FlexIO modular switches, you can cost-effectively scale your I/O needs, adding ports and functionality through expansion modules—including 10 Gb uplinks and stacking ports—instead of needing to buy complete new switches. Dell provides a range of solutions for building on your investment to avoid costly "rip and replace" scenarios.

1.1.4 Smart Investment

The M610 is a foundational component of smart M-Series blade solutions that can help protect your infrastructure investments, simplify your IT environment, and drive real and sustainable savings in power efficiency and productivity. Features include:

- A future-ready, passive midplane capable of supporting multiple generations of blade servers and a full array of upcoming I/O technologies
- FlexIO eliminates "rip and replace" blade switch upgrades; modularity is built into the switches
- FlexAddress™ technology simplifies efforts and interactions between server and networking teams by providing slot-assigned, persistent WWN/iSCSI/MAC addresses for maintenance, without additional management tools or proprietary hardware

- Energy Smart Technologies, including ultra-efficient fans and power supplies for outstanding energy efficiency

With savings in time and money previously needed for maintenance, you free up resources that can be used for true innovation.

1.1.5 Simplified Systems Management

The next generation Dell™ OpenManage™ suite offers enhanced operations and standards-based commands designed to integrate with existing systems for effective control.

1.1.6 Lifecycle Controller

Lifecycle Controller is the engine for advanced systems management integrated on the server. Lifecycle Controller simplifies administrator tasks so you can perform a complete set of provisioning functions such as system deployment, system updates, hardware configuration and diagnostics from a single intuitive interface called Unified Server Configurator (USC) in a pre-OS environment. This eliminates the need to use and maintain multiple pieces of disparate CD/DVD media.

1.2 Product Comparison

Table 1. Product Comparisons

	M610x	M610	M710HD	M710
Description	Special purpose full-height	General purpose half-height	General purpose half-height	General purpose full-height
Processor	Intel® Xeon® processors 5500 and 5600 series			
Front Side Bus	Intel QuickPath Interconnect (QPI)			
Sockets	Two			
Max Cores per Socket	Up to six			
L2/L3 Cache	8MB (5500 Series) or 12MB (5600 Series)			
Chipset	Intel 5520			
DIMMs	12 x DDR3 DIMMs (800/1066/1333MT/s)	12 x DDR3 DIMMs (800/1066/1333MT/s)	18 x DDR3 DIMMs (800/1066/1333MT/s)	18 x DDR3 DIMMs (800/1066/1333MT/s)
Min/Max RAM	4GB/192GB (16GB DIMMS)	4GB/192GB (16GB DIMMS)	4GB/288GB (16GB DIMMS)	4GB/288GB (16GB DIMMS)
Form Factor	Full-height blade, dual-socket, expansion module	Half-height blade, dual-socket	Half-height blade, dual-socket	Full-height blade, dual-socket
Hard Drive Bays (2.5” only)	SAS: 2 x 2.5” (hot-pluggable) SATA: 1 x 2.5”	SAS: 2 x 2.5” (hot-pluggable) SATA: 1 x 2.5”	SAS: 2 x 2.5” (hot-pluggable) SSD SATA: 2 x 2.5”	SAS: 2 x 2.5” (hot-pluggable) SSD SATA: 2 x 2.5”
Hard Drive Types	SAS/SSD			

	M610x	M610	M710HD	M710
Hard Drive Controller	PERC H200 PERC H700 PERC H800 SAS 6/E	PERC H200 Non-RAID SATA (one hard drive only) PERC H700 CERC 6/i SAS 6/iR PERC 6/i with RAID battery	Embedded H200	PERC H200 PERC H700 CERC 6/i SAS 6/iR PERC 6/i with RAID battery
Optional HD Controller	Embedded H200	SAS 6/iR PERC 6/i with RAID battery	Embedded H200	SAS 6/iR PERC 6/i with RAID battery
Availability	Hot-plug hard drives Hot-plug redundant power and cooling ECC memory Single Device Data Correction (SDDC) supports memory demand and patrol scrubbing High availability failover cluster support			
Server Management	Integrated Dell Remote Access Controller iDRAC6 Express/Enterprise (both standard) w/ IPMI 2.0 +vMedia/vKVM, and CMC (on the PowerEdge M1000e chassis)			
Mezzanine Slots	2 x8 (PCIe Gen2); Fabric B limited to a small form factor (SFF) mezzanine card	2 x8 (PCIe Gen2); Fabric B limited to a small form factor (SFF) mezzanine card	2 x8 PCIe mezzanine cards	1 x4 and 3 x 8 PCIe mezzanine cards
IO Slots	Two x16 PCIe Gen2 H800 / 6GB SAS NVIDIA® M1060 and M2050-204	NA	NA	NA
RAID	0,1	0,1	0,1	0,1,5
NIC/LOM	2-port Broadcom® 5709S 1Gb w/ TOE plus optional iSCSI Accelerator	2-port Broadcom® 5709S 1Gb w/ TOE plus optional iSCSI Accelerator	4 x 1GbE dual Broadcom® BCM5709S	4 x TOE with optional iSCSI offload
USB	2 external, 1 internal	2 external, 1 internal	2 x external USB 2.0 ports at front bezel 1 x internal USB port	3 x external USB 2.0 ports at front bezel 1 x internal USB port

	M610x	M610	M710HD	M710
SD Card	2: 1 for Persistent Storage 1 for Management	2: 1 for Persistent Storage 1 for Management	2 x internal SD slot 1 for Persistent Storage 1 for Management (can also be configured as redundant SD cards for embedded hypervisor)	1 x internal SD slot 1 for Persistent Storage 1 for Management
TPM	Yes, except in China where TCM is the standard			
Video	Matrox® G200eW integrated into iDRAC chip			
Power Supplies	See the *PowerEdge M1000e Technical Guide*.			
Fans	See the *PowerEdge M1000e Technical Guide*.			
Chassis	See the *PowerEdge M1000e Technical Guide*.			

2 New Technologies

2.1 Overview

The Dell™ PowerEdge™ M610 is a half-height blade within a PowerEdge M1000e full-height blade enclosure. The PowerEdge M610 features include:

- Dual quad- and six-core Intel Xeon processor 5500 and 5600 series
- Intel IOH (24D I/O Hub)
- Intel QuickPath Architecture
- DDR3 memory
- DIMM thermal sensors
- Internal SD Module
- iDRAC6 Express

3 System Information

Table 2 summarizes the product features for the Dell™ PowerEdge™ M610. For the latest information on supported features for the PowerEdge M610, visit Dell.com.

Table 2. Product Features Summary

Feature	Technical Specifications	
Processors	Quad-core or six-core Intel® Xeon® processors 5500 and 5600 series	
Chipset	Intel 5520	
Memory[1]	Up to 192GB (12 DIMM slots) 1GB/2GB/4GB/8GB/16GB ECC DDR3 up to 1333MT/s	
Drive Bays	Two 2.5" SAS/Solid State hot-swappable drives	
Storage[1]	**Hot-plug hard drive options:** 2.5" SAS SSD, SATA SSD, SAS (15K, 10K), nearline SAS (7.2K), SATA (7.2K) **Maximum internal storage:** Up to 1.8TB per blade	**External storage:** For information about Dell external storage options, visit Dell.com/Storage.
RAID Controller Options	**Internal:** PERC H200 Modular (6Gb/s) PERC H700 Modular (6Gb/s) with 512MB battery-backed cache; 512MB, 1GB non-volatile battery-backed cache SAS 6/iR Modular CERC 6/i Modular PERC 6/i Modular with 256MB battery-backed cache	
I/O Mezzanine Card Options	**1Gb and 10Gb Ethernet:** Dual-Port Broadcom® Gb Ethernet with TOE (BCM-5709S) Quad-Port Intel® Gb Ethernet (BCM-82576) Quad-Port Broadcom® Gb Ethernet (BCM-5709S) Dual-Port Broadcom® 10Gb Ethernet (BCM-57711) **10Gb Enhanced Ethernet and Converged Network Adapters (CEE/DCB):** Dual Port Intel 10GB Enhanced Ethernet Server Adapter X520-DA2 (FcoE ready for future enablement) Dual-Port QLogic® CNA (QME8142) (supports CEE/DCB 10GbE + FCoE) Dual-Port QLogic CNA (QME8242-k) - Supports 10GbE + NPAR Brocade® BR1741M-k Dual-Port Mezzanine CNA	**Fibre Channel:** Dual-Port QLogic® FC8 Fibre Channel Host Bus Adapter (HBA) (QME2572) Dual-Port Emulex® FC8 Fibre Channel Host Bus Adapter (HBA) (LPe1205-M) Emulex® 8 or 4 Gb/s Fibre Channel Pass-Through Module **InfiniBand:** Dual-Port Mellanox® ConnectX Quad Data Rate (QDR) InfiniBand Dual-Port Mellanox® ConnectX Dual Data Rate (DDR) InfiniBand

Feature	Technical Specifications
Operating Systems	Microsoft® Windows Server® 2008 SP2, x86/x64 (x64 includes Hyper-V®) Microsoft Windows Server 2008 R2 SP1, x64 (includes Hyper-V v2) Microsoft Windows® HPC Server 2008 Novell® SUSE® Linux® Enterprise Server Red Hat® Enterprise Linux® Oracle® Solaris™ **Virtualization Options:** Citrix® XenServer™ Microsoft Hyper-V with Microsoft Windows Server 2008 VMware® vSphere™ 4.1 (including VMware ESX® 4.1, VMware ESXi™ 4.1, or ESXi 5.0) For more information on the specific versions and additions, visit Dell.com/OSsupport.
Featured Database Applications	Microsoft SQL Server® solutions (see Dell.com/SQL) Oracle® database solutions (see Dell.com/Oracle)
Power Supply	Supplied by Dell™ PowerEdge™ M1000e Blade Chassis
Video	Matrox® G200 with 8 MB of cache
Systems Management	Dell™ OpenManage™ featuring Dell Management Console Unified Server Configurator Lifecycle Controller BMC, IPMI2.0 compliant iDRAC6 Enterprise with optional vFlash Remote Management: iDRAC6 Enterprise with optional vFlash
Embedded Hypervisor	Optional embedded SD media
[1]GB means 1 billion bytes and TB equals 1 trillion bytes; actual capacity varies with preloaded material and operating environment and will be less.	

4 Mechanical

4.1 Chassis Description

The Dell™ PowerEdge™ M610 is a half-height blade server that requires an M1000e chassis to operate.

Figure 1. PowerEdge M1000e

The M610 server occupies one slot in the M1000e rack chassis for a maximum of 16 blades in one M1000e chassis. It can be mixed with other existing Dell blades and is designed to mix with possible future half- and full-height double-wide blades. Some highlights are:

- Support for RAID
- Support for persistent storage (internal USB connector and two external SD card slots)

Refer to the *PowerEdge M1000e Technical Guide* for information on fans, power and power supply, racks, security, and other chassis information.

4.2 Dimensions and Weight

The PowerEdge M610 dimensions and weight are as follows:

- Height: 18.9cm (7.4in)
- Width: 5cm (2in)
- Depth: 48.6cm (19.2in)
- Weight (Maximum Configuration): 11.1kg (24.5lb)

4.3 Internal Module View

A view of the internal module is shown in Figure 2. See the Opening and Closing the Blade section in the Installing Blade Components chapter in the *Dell PowerEdge Modular Systems Hardware Owner's Manual* on Support.Dell.com/Manuals for more information.

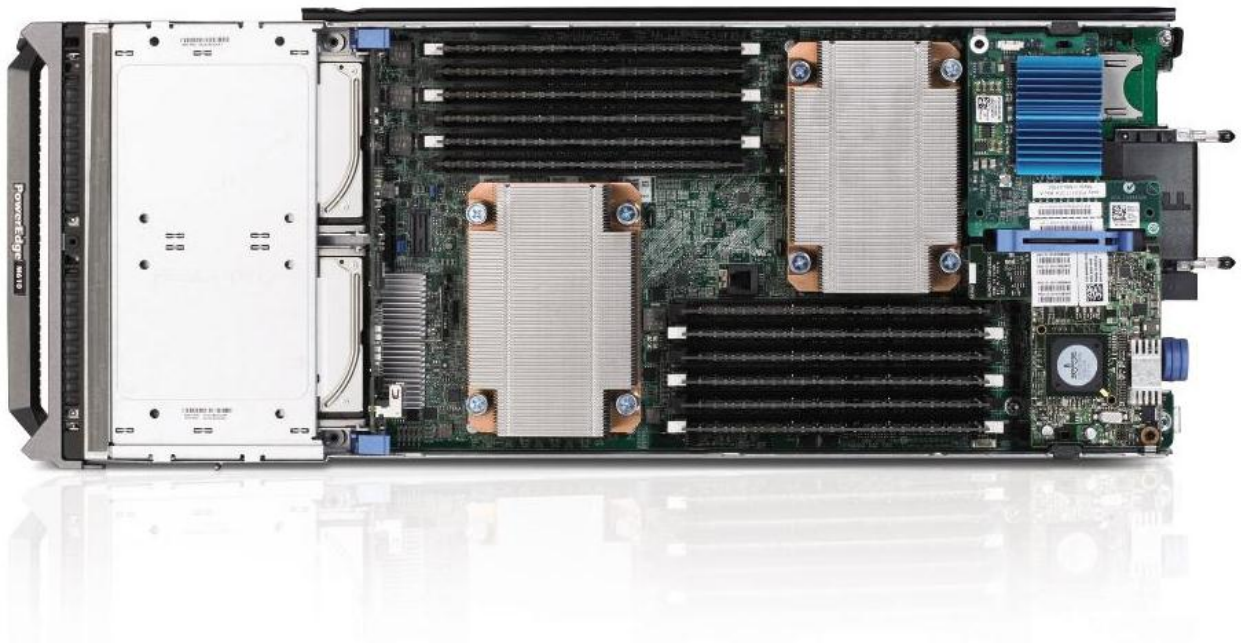

Figure 2. Internal view

4.4 Cover Latch

The blade module includes a latch for the cover. See the Opening and Closing the Blade section in the Installing Blade Components chapter in the *Dell PowerEdge Modular Systems Hardware Owner's Manual* on Support.Dell.com/Manuals for more information.

4.5 Security

The M610 offers a configurable client IP address range for clients connecting to iDRAC6. For additional information regarding the PowerEdge M610 security features, see the *Dell PowerEdge Modular Systems Hardware Owner's Manual* on Support.Dell.com/Manuals.

4.5.1 TPM (Trusted Platform Module)

The TPM is used to generate/store keys, protect/authenticate passwords, and create/store digital certificates. TPM can also be used to enable the BitLocker™ hard drive encryption feature in Windows Server 2008. TPM is enabled through a BIOS option and uses HMAC-SHA1-160 for binding. TCM is available in China.

4.5.2 Power Off Security

Through the BIOS, the front blade server USB ports and power button can be disabled so as to not allow any control of the system from the front of the blade. The enclosure video can also be restricted.

The BIOS System Setup program's system security screen allows administrators to set the system password, control TPM activation and reporting, clear the TPM's memory, and disable the power button and USB ports.

4.6 USB Key

The M610 supports the following USB devices:

- DVD (bootable; requires two USB ports)
- USB Key (bootable)
- Keyboard (only one USB keyboard is supported)
- Mouse (only one USB mouse is supported)

4.7 Battery

A replaceable coin cell CR2032 3V battery is mounted on the planar to provide backup power for the Real-Time Clock and CMOS RAM on the ICH9 chip.

4.8 Field Replaceable Units (FRU)

The planar contains a serial EEPROM to contain FRU information including Dell part number, part revision level, and serial number.

4.9 User Accessible Jumpers, Sockets, and Connectors

For information, see the System Board Information chapter in the *Dell PowerEdge Modular Systems Hardware Owner's Manual* on Support.Dell.com/Manuals.

5 Power, Thermal, Acoustic

5.1 Power Supplies

See the *PowerEdge M1000e Technical Guide* for information on power supplies and power supply specifications.

5.2 Power Efficiency

One of the main features of blade servers is enhanced power efficiency. The Dell™ PowerEdge™ M610 achieves higher power efficiency by implementing the following features:

- User-configurable power options through the M1000e Chassis Management Controller (CMC) (see the M1000e documentation online at Dell.com/Support for further details)
- Improved power budgeting
- Voltage Regulator (VR) efficiency improvements
- Processor VR dynamic phase shedding
- Switching regulators instead of linear regulators
- Closed loop thermal throttling
- Use of DDR3 memory (lower voltage compared to DDR2)
- Memory VR static phase shedding
- BIOS Power/Performance options page
- Active Power Controller (BIOS-based processor P-state manager)
- Ability to throttle memory
- Ability to disable a processor core
- Ability to turn off embedded NICs when not being used
- Energy Smart components at the M1000e chassis level to selectively enable more computing performance with less power consumption.

5.3 Thermal Operating and Storage Specifications

The M610 thermal solution includes:

- Optimized airflow impedance for individual blade and chassis level airflow balancing
- Custom air baffling directs airflow through the components to maintain proper cooling
- Custom designed heat sinks maintain processor, DIMM, and board-level chip temperatures within thermal design targets
- Highly Optimized Fan Control Algorithm
    - Base fan speeds are a function of hardware configuration and ambient temperature to minimize airflow for a given environment.
    - Component algorithms: CPU PID, DIMMs, HW Configuration, IOH, GPU, and External Ambient.
    - The highest fan speed request from the above algorithms is used to set the appropriate fan speed for the blade.
    - Ambient and HW Configuration sets the minimum – other algorithms increase fan speed to maintain proper cooling.

Thermal specifications for the PowerEdge M610 are detailed in Table 3 along with other important operating and storage information.

Table 3. Operating and Storage Specifications

Temperature	
Operating	10° to 35° C (50° to 95° F) with a maximum temperature gradation of 10° C per hour Note: For altitudes above 2950 feet, the maximum operating temperature is derated 1°F/500ft
Storage	-40° to 65°C (-40° to 149°F) with a maximum temperature gradation of 20°C per hour
Relative Humidity	
Operating	20% to 80% (noncondensing) with a maximum humidity gradation of 10% per hour
Storage	5% to 95% (noncondensing) with a maximum humidity gradation of 10% per hour
Maximum Vibration	
Operating	0.26 Grms at 5-350 Hz in operational orientations
Storage	1.54 Grms at 10-250 Hz in all orientations
Maximum Shock	
Operating	Half sine shock in all operational orientations of 31 G +/- 5% with a pulse duration of 2.6 ms +/- 10%
Storage	Half sine shock on all six sides of 71 G +/- 5% with a pulse duration of 2 ms +/- 10%
Altitude	
Operating	-15.2m to 3048 m (-50 to 10,000 ft) **Note:** For altitudes above 2950 ft, the maximum temperature is derated 1° F/550 ft
Storage	-16 to 10,600 m (-50 to 35,000 ft)
Airborne contaminant level	
Class G1 or lower as defined by ISA-S71.04-1985 (G1 maximum corrosive contaminant levels measured at ≤ 50% relative humidity)	

5.4 Acoustics

The acoustical design of the PowerEdge M610 reflects adherence to Dell's high sound quality standards. Sound quality is different from sound power level and sound pressure level in that it describes how humans respond to annoyances in sound, like whistles, hums, etc. One of the sound quality metrics in the Dell specification is prominence ratio of a tone.

0 shows the acoustical performance for a typical configuration of the M1000e chassis with eight PowerEdge M610 blade servers installed. Acoustical performance varies with hardware configurations.

Table 4. Acoustical Performance of M1000e Chassis with Eight M610 Blades Installed

Typical Configuration (per blade) @ 23±2˚C Ambient in M1000e Chassis	
Operating Mode	**LwA-UL (bels)**
Idle	7.4

Definitions

Typical configuration: The system is populated with projected average quantity, type, capacity, speed, etc., of components.

Idle: Reference ISO7779 (2010) definition 3.1.7; system is running in its OS but no other specific activity.

LwA – UL: The upper limit sound power level (LwA) calculated per section 4.4.2 of ISO 9296 (1988) and measured in accordance to ISO 7779 (2010).

6 Processors

6.1 Overview

The Intel® Xeon® processor 5500 and 5600 series are designed specifically for servers and workstation applications. These processors feature quad-core processing to maximize performance and performance-per-watt for data center infrastructures and highly-dense deployments. They feature Intel Core™ micro-architecture and Intel 64 architecture for flexibility in 64-bit and 32-bit applications and operating systems, and they use a 1366-contact Flip-Chip Land Grid Array (FC-LGA) package that plugs into a surface-mount socket. The M610 provides support for up to two processors.

6.2 Features

Key features of the Intel Xeon processor 5500 series include:

- Up to four cores per processor
- Two point-to-point QuickPath Interconnect links at 6.4 GT/s
- 45 nm process technology
- No termination requirement for non-populated processors (must populate CPU socket 1 first)
- Integrated QuickPath DDR3 memory controller
- 64-byte cache line size
- RISC/CISC hybrid architecture
- Compatibility with existing x86 code base
- MMX™ support
- Execute Disable Bit
- Intel Wide Dynamic Execution
- Ability to execute up to four instructions per clock cycle
- Simultaneous Multi-Threading (SMT) capability
- Support for processor Turbo Mode (on certain SKUs)
- Processor frequency increases if operating below thermal, power, and current limits
- Streaming SIMD (Single Instruction, Multiple Data) Extensions 2, 3, and 4
- Intel® 64 Technology
- Intel® VT-x and VT-d technology for virtualization support
- Enhanced Intel® SpeedStep® technology
- Demand-based switching for active processor power management as well as support for ACPI P-States, C-States and T-States

The Intel Xeon processor 5600 series encompasses all the features of the 5500 series, and also includes the following:

- New top BIN processors at 130W TDP
- Support for DDR3L, 1.35v DIMMs for even lower system power
- Support for memory sparing
- AES-NI (hardware encryption assist) for more efficient encryption for uses such as online transactions SSL.
- Intel TXT (Trusted Execution Technology) provides hardware assisted protection against emerging software attacks

Table 5. Comparison of Processor Technology

Intel® Xeon® Processor	5400 Series	5500 Series	5600 Series
Cores	4	4	6
Last Level Cache	2 x 6MB shared	8MB shared	12MB shared
FSB (MT/s) / Link Frequency (GT/s)	1333MT/s	Up to 6.4 GT/s	Up to 6.4 GT/s
Max TDP	120W	130W for WS 95W for Server	130W for WS and Server
Max Frequency	>3GHz	>3GHz	>3GHz
Memory Controller	Separate in chipset	Integrated 3-channel DDR3	Integrated 3-channel DDR3
Process Technology	45nm	45nm	32nm
Intel® Trusted Execution Technology	No	No	Yes
Intel® Advanced Encryption Security- New Instructions	No	No	Yes
Intel® Virtualization Technology	Yes	Yes	Yes
Intel® 64	Yes	Yes	Yes
Intel® Hyper-Threading Technology	No	Yes	Yes
Socket	LGA771	LGA1366	LGA1366

6.3 Supported Processors

The Dell™ PowerEdge™ M610 supports the Intel® Xeon® processors 5500 and 5600 series, which are detailed in **Error! Reference source not found.**.

Table 6. Supported Processors

Model	Speed	TDP Power	Cache	Cores	Max Memory Speed	QPI Link Speed	Turbo Mode Enabled	Hyper-threading
X5687	3.6GHz	130W	12M	4	1333MT/s	6.4GT/s	Yes	Yes
X5690	3.46GHz	130W	12M	6	1333MT/s	6.4GT/s	Yes	Yes
X5677	3.46GHz	130W	12M	4	1333MT/s	6.4GT/s	Yes	Yes
X5680	3.33GHz	95W	12M	6	1333MT/s	6.4GT/s	Yes	Yes
X5672	3.2GHz	95W	12M	4	1333MT/s	6.4GT/s	Yes	Yes
X5675	3.06GHz	95W	12M	6	1333MT/s	6.4GT/s	Yes	Yes
X5667	3.06GHz	95W	12M	4	1333MT/s	6.4GT/s	Yes	Yes
X5670	2.93GHz	95W	12M	6	1333MT/s	6.4GT/s	Yes	Yes
X5647	2.93GHz	130W	12M	4	1333MT/s	5.86GT/s	Yes	Yes
X5660	2.8GHz	95W	12M	6	1333MT/s	6.4GT/s	Yes	Yes
X5560	2.8GHz	95W	8M	4	1333MT/s	6.4GT/s	Yes	Yes
E5560	2.8GHz	95W	8M	4	1333MT/s	6.4GT/s	Yes	Yes
X5650	2.66GHz	95W	12M	6	1333MT/s	6.4GT/s	Yes	Yes
E5640	2.66GHz	80W	12M	4	1066MT/s	5.86GT/s	Yes	Yes
E5649	2.53GHz	80W	12M	6	1333MT/s	5.86T/s	Yes	Yes
E5630	2.53GHz	80W	12M	4	1066MT/s	5.86GT/s	Yes	Yes
E5645	2.4GHz	80W	12M	6	1333MT/s	5.86GT/s	Yes	Yes
E5620	2.4GHz	80W	12M	4	1066MT/s	5.86GT/s	Yes	Yes
E5530	2.4GHz	80W	8M	4	1066MT/s	5.86GT/s	Yes	Yes
L5640	2.26GHz	60W	12M	6	1066MT/s	5.86GT/s	Yes	Yes
L5520	2.26GHz	60W	8M	4	1066MT/s	5.86GT/s	Yes	Yes
E5607	2.26GHz	80W	8M	4	1066MT/s	4.8GT/s	No	No
L5630	2.13GHz	40W	12M	4	1066MT/s	5.86GT/s	Yes	Yes
E5606	2.13GHz	80W	8M	4	1066MT/s	4.8GT/s	No	No
E5506	2.13GHz	60W	4M	4	800MT/s	4.8GT/s	No	No
L5609	1.86GHz	40W	12M	4	1066MT/s	4.8GT/s	No	No

6.4 Processor Installation

See the Processors section in the Installing Blade Components chapter in the *Dell PowerEdge Modular Systems Hardware Owner's Manual* on Support.Dell.com/Manuals.

7 Memory

7.1 Overview

The Dell™ PowerEdge™ M610 uses DDR3 memory providing a high-performance, high-speed memory interface capable of low latency response and high throughput. The M610 supports Registered ECC DDR3 DIMMs (RDIMM) as well as the low-voltage RDIMMs and Unbuffered ECC DDR3 DIMMs (UDIMM).

The DDR3 memory interface consists of three channels with up to two RDIMMs or UDIMMs per channel for single/dual rank and up to two RDIMMs per channel for quad rank. The interface uses 2 GB, 4 GB, or 8 GB RDIMMs. 1 GB or 2 GB UDIMMs are also supported. The memory mode is dependent on how the memory is populated in the system, according to the following guidelines:

- Three channels per processor populated identically
  - The system is typically set to run in Memory Optimized (Independent Channel) mode in this configuration. This mode offers the most DIMM population flexibility and system memory capacity, but offers the least number of RAS (reliability, availability, and serviceability) features.
  - All three channels must be populated identically
  - Memory sparing is not supported on the M610 with 5500 series processors.
- The first two channels per processor populated identically with the third channel unused
  - Two channels typically operate in Advanced ECC (Lockstep) mode with each other by having the cache line split across both channels. This mode provides improved RAS features (SDDC support for x8-based memory).
  - For Memory Mirroring, two channels operate as mirrors of each other (write functions go to both channels and read functions alternate between the two channels).
- One channel per processor populated (This is a simple Memory Optimized mode. No mirroring or sparing is supported.)

The M610 memory interface supports memory demand and patrol scrubbing, single-bit correction, and multi-bit error detection. Correction of an x4 or x8 device failure is also possible with SDDC in the Advanced ECC mode. Additionally, correction of an x4 device failure is possible in the Memory Optimized mode.

7.2 DIMMs Supported

The following memory requirements apply to the M610:

- If DIMMs of different speeds are mixed, all channels operate at the fastest common frequency.
- RDIMMs and UDIMMs cannot be mixed.
- If memory mirroring is enabled, identical DIMMs must be installed in the same slots across both channels. The third channel of each processor is unavailable for memory mirroring.
- The first DIMM slot in each channel is color-coded with white ejection tabs for ease of installation.
- The M610 memory system supports up to 12 DIMMs.
- DIMMs must be installed in each channel starting with the DIMM farthest from the processor.
- Population order is identified by the silkscreen designator and the System Information Label (SIL) located on the chassis cover.

7.3 Memory Features

Key features of the M610 memory system include:

- Registered (RDIMM) and Unbuffered (UDIMM) ECC DDR3 technology
- Each channel carries 64 data and eight ECC bits
- Support for up to 192 GB of RDIMM memory (with twelve 16 GB RDIMMs)
- Support for up to 24 GB of UDIMM memory (with twelve 2 GB UDIMMs)
- Support for 1066/1333 MT/s single and dual rank DIMMs
- Support for 1066 MT/s quad rank DIMMs
- Single DIMM configuration only with DIMM in socket A1
- ODT support (On Die Termination)
- Clock gating (CKE) to conserve power when DIMMs are not accessed (DIMMs enter a low-power self-refresh mode)
- I^2C access to SPD EEPROM for access to RDIMM thermal sensors
- Single Bit Error Correction
- SDDC (Single Device Data Correction – x4 or x8 devices)
- Support for Closed Loop Thermal Management on RDIMMs and UDIMMs
- Multi Bit Error Detection
- Support for Memory Optimized Mode
- Support for Advanced ECC mode
- Support for Memory Mirroring

Memory sparing is not supported on 5500 series processors but it is supported on systems using 5600 series processors. While 800 MT/s DIMMs are not supported, the installation of two quad-rank 1066 MT/s DIMMs will operate at 800 MT/s.

7.4 Memory Speed Limitations

The memory frequency is determined by a variety of inputs:

- Speed of the DIMMs
- Speed supported by the processor
- Configuration of the DIMMs

The M610 supports two DIMMs per channel at 1333 MT/s. To run the maximum memory configuration (12 x 16 GB DIMMS = 192 GB) at 1333 MT/s, use dual-rank 16 GB DIMMs.

If you want to run at 1066MT/s, the maximum amount of quad-rank DIMMs allowed is 1DPC (DIMM per channel), which equals three DIMMs per CPU or six DIMMs total.

For quad-rank DIMMs mixed with single- or dual-rank DIMMs, the quad-rank DIMM needs to be in the slot with the white ejection tabs (the first DIMM slot in each channel). There is no requirement for the order of single-rank and dual-rank DIMMs.

Table 7 shows the memory populations and the maximum frequency achievable for that configuration.

Table 7. Maximum Supported Memory Frequencies

DIMM Type	DIMM 0	DIMM 1	# of DIMMs	800	1066	1333
UDIMM	SR	—	1	✓	✓	✓
	DR	—	1	✓	✓	✓
	SR	SR	2	✓	✓	×
	SR	DR	2	✓	✓	×
	DR	DR	2	✓	✓	✓
RDIMM	SR	—	1	✓	✓	✓
	DR	—	1	✓	✓	✓
	QR	—	1	✓	✓	×
	SR	SR	2	✓	✓	×
	SR	DR	2	✓	✓	×
	DR	DR	2	✓	✓	✓
	QR	SR	2	✓	×	×
	QR	DR	2	✓	×	×
	QR	QR	2	✓	×	×

8 Chipset

8.1 Overview

The Dell™ PowerEdge™ M610 system board incorporates the Intel 5520 chipset for I/O and processor interfacing. The chipset was designed to support the Intel® Xeon® Processor 5500 and 5600 series, QuickPath Interconnect, and DDR3 memory technology. The chipset consists of the I/O Hub (IOH) and Intel I/O Controller Hub 9 (ICH9).

8.2 I/O Hub (IOH)

The M610 system board uses the Intel 5520 chipset 24D IOH to provide a link between the processor(s) and I/O components. The main components of the IOH consist of two full-width QuickPath Interconnect links (one to each processor), 36 lanes of PCI Express Gen2, a x4 Direct Media Interface (DMI), and an integrated IOxAPIC.

8.2.1 QuickPath Interconnect (QPI)

The QuickPath Interconnect architecture consists of serial point-to-point interconnects for the processors and the IOH. The M610 has a total of three QuickPath Interconnect (QPI) links: one link connecting the processors and links connecting both processors with the IOH. Each link consists of 20 lanes (full-width) in each direction with a link speed of 6.4 GT/s. An additional lane is reserved for a forwarded clock. Data is sent over the QPI links as packets.

The QuickPath architecture implemented in the IOH and processors features four layers. The Physical layer consists of the actual connection between components. It supports Polarity Inversion and Lane Reversal for optimizing component placement and routing. The Link layer is responsible for flow control and the reliable transmission of data. The Routing layer is responsible for the routing of QPI data packets. Finally, the Protocol layer is responsible for high-level protocol communications, including the implementation of a MESIF (Modify, Exclusive, Shared, Invalid, Forward) cache coherence protocol.

8.2.2 IOH PCI Express

PCI Express is a serial point-to-point interconnect for I/O devices. PCIe Gen2 doubles the signaling bit rate of Gen1 from 2.5 Gb/s to 5 Gb/s. Each of the PCIe Gen2 ports are backwards-compatible with Gen1 transfer rates.

8.2.3 Direct Media Interface (DMI)

The DMI connects the IOH with the Intel I/O Controller Hub 9 (ICH9). The DMI is equivalent to a x4 PCIe Gen1 link with a transfer rate of 1 GB/s in each direction.

8.3 I/O Controller Hub 9 (ICH9)

ICH9 is a highly-integrated I/O controller, supporting the following functions:

- Serial ATA (SATA) ports with transfer rates up to 300 MB/s
- Six UHCI and two EHCI (high-speed 2.0) USB host controllers, with up to 12 USB ports (M610 provides four of these ports for internal and external use)
- Power management interface (ACPI 3.0b compliant)
- Platform Environmental Control Interface (PECI)
- I/O interrupt controller

- SMBus 2.0 controller
- Low Pin Count (LPC) interface to Trusted Platform Module (TPM), and SPI-VU
- Serial Peripheral Interface (SPI) support for up to two devices (M610 BIOS is connected to the ICH9 using SPI)

9 BIOS

9.1 Overview

The Dell™ PowerEdge™ M610 BIOS is based on the Dell BIOS core, and supports the following features:

- Intel® Xeon® processor 5500 and 5600 series 2S support
- Simultaneous Multi-Threading (SMT) support
- CPU Turbo Mode support
- PCI 2.3 compliant
- Plug and play 1.0a compliant
- MP (Multiprocessor) 1.4 compliant
- Ability to boot from hard drive, optical drive, iSCSI drive, USB key, and SD card
- ACPI support
- Direct Media Interface (DMI) support
- PXE, ISCSI, and WOL support for on-board NIC
- Memory mirroring
- SETUP access through F2 key at end of POST
- USB 2.0 (USB boot code is 1.1 compliant)
- F1/F2 error logging in CMOS
- Virtual KVM, CD, and floppy support
- Unified Server Configurator (UEFI 2.1) support
- Power management support including DBS, Power Inventory, and multiple power profiles

9.2 Supported ACPI States

The M610 supports the standard Advanced Configuration and Power Interface (ACPI) states.
To learn more, see http://www.acpi.info/.

10 Embedded NICs/LAN on Motherboard (LOM)

10.1 Overview

The Dell™ PowerEdge™ M610 planar has two embedded Broadcom® 5709S dual-port LAN controllers as independent Gigabit Ethernet interface devices. The following information details the features of the LAN devices:

- x4 PCI Express Gen2 capable interface (M610 operates this controller at Gen1 speed)
- Integrated MAC and PHY
- 3072x18 Byte context memory
- 64 KB receive buffer
- TOE (TCP Offload Engine)
- RDMA controller (RNIC)
- NC-SI (Network Controller-Sideband Interface) connection for manageability
- Wake-On-LAN (WOL)
- PXE 2.0 remote boot
- iSCSI boot
- IPv4 and IPv6 support
- Bare metal deployment support
- ISCSI offload accelerator used for offloading ISCSI traffic as an ISCSI accelerator/HBA (optionally enabled through a hardware key)

The embedded NICs are not sharable with iDRAC since the blade iDRAC has a dedicated 100 Mbps link (Fabric D).

10.2 Platform Networking LAN on Motherboard (LOM) Technology Overview

The PowerEdge M610 has two Ethernet ports because it includes two built-in dual-port 1GbE converged networking (CNIC) LOMs based on Broadcom 5709 controllers. The M610 supports multiple functions over a unified fabric to help manage Ethernet, iSCSI, and remote management traffic on each port simultaneously.

Enterprise networks that use multiple protocols and multiple network fabrics benefit from the Broadcom C-NICs LOMs' ability to combine network traffic, storage, and clustering over a single Ethernet fabric by boosting server processor performance and memory utilization while alleviating I/O bottlenecks.

Each BCM5709S LOM provides dual 10/100/1000BASE-T Gigabit Ethernet functions, an IEEE802.3-compliant media access controller (MAC), and a UTP copper physical layer transceiver solution for high-performance network applications. It enables simultaneous convergence of all networked communications possible in a server, such as data network (LAN), storage network (such as block, iSCSI, or file [for example, CIFS/NFS]), and clustering (such as High-Performance Computing [HPC]).

11 I/O Slots (I/O Mezzanine Card Options for M1000e)

11.1 Overview

The Dell™ PowerEdge™ M610 has two PCIe x8 Gen2 mezzanine card slots. Installation of mezzanine cards requires an M1000e I/O Module (IOM) of the same fabric technology to be installed in the corresponding fabric slot of the mezzanine to support data flow through that fabric/slot.

11.2 Options

Available options for mezzanine card slots include the following:

- Broadcom® Dual-Port 5709
- Broadcom Quad-Port 5709
- Intel® ET Quad-Port 82576
- Broadcom Dual-Port 57711
- Brocade® CNA Dual-Port BR1741M-k
- Intel Ethernet X520 10GbE x/k
- QLogic® CNA QME8142
- QLogic CNA QME8242-k
- Emulex® CNA OCM10102FM
- QLogic QME2572 (FC8)
- Emulex LPe1205 (FC8)
- Mellanox® ConnectX™-2 DDR IB (SFF)
- Mellanox ConnectX™-2 QDR IB (SFF)

12 Storage

12.1 Overview

The Dell™ PowerEdge™ M610 supports two 2.5” storage drives that connect to its hot-plug backplane. These drives can be either SATA or SAS, and either HDD or SSD, though if two are installed, they both must be of the same technology type.

All enterprise-class 2.5” storage drives sold by Dell are qualified, including those that offer Self Encrypting Drive functionality as well as the 6Gb SAS drives. All storage drives used with the PERC H700 must be purchased from Dell.

12.2 Hard Disk Drive Carriers

The M610 supports a 2.5” hard drive carrier as shown in Figure 3.

Figure 3. 2.5” HDD Carrier

12.3 Empty Drive Bays

For the slots that are not occupied by drives, a carrier blank is provided to maintain proper cooling, maintain a uniform appearance to the unit, and provide EMI shielding.

12.4 Diskless Configuration Support

The system supports diskless configuration with no storage controller (H200/PERC 7i) installed in the system. A 2.5” HDD backplane is installed in this configuration.

12.5 RAID Configurations

Both RAID 0 and RAID 1 are supported as long as a RAID card is included.

12.6 Storage Controllers

The M610 supports a variety of internal RAID cards through a dedicated PCI Express Gen1 x4 slot, as shown in the matrix on Dell.com.

12.6.1 SATA Repeater (MOD N014K)

The M610 internal SATA Repeater HBA is an expansion card that plugs into the dedicated storage controller slot. The card is connected to the ICH9 SATA port through the controller slot to support one SATA 2.5” hard drive. The SATA drives are not hot-pluggable.

12.6.2 SAS 6/iR

The M610 internal SAS 6/iR HBA is an expansion card that plugs into the dedicated storage controller slot. This card incorporates two four-channel SAS IOCs for connection to SAS hard disk drives (SATA not supported). This card is designed in a form factor that allows the same card to be used in any blade server with a storage card connector. RAID 0 and 1 are supported.

12.6.3 CERC 6/iR

For a hardware RAID solution, the CERC 6/iR is an option. The CERC 6/iR uses the LSI 1078 ROC (RAID on Chip) processor with a PCI Express host interface and DDR2 memory. A battery is not available with this card. For details of this card, see the PERC6 Hardware Product Specification.

12.6.4 PERC 6/i

For another hardware RAID solution, the PERC 6/i is also an option. The PERC 6/i uses the LSI 1078 ROC (RAID on Chip) processor with a PCI Express host interface and DDR2 memory. A battery is available with this card. For details of this card, see the PERC6 Hardware Product Specification.

12.6.5 PERC H200 (Modular version)

The PERC H200M is an entry RAID solution with no cache.

12.6.6 PERC H700 (Modular version)

See the PERC H700 Technical Guidebook for more information on PERC H700M.

12.7 Hard Drive LED Indicators

Each disk drive carrier has two LED indicators visible from the front of the system. One is a green LED for disk activity and the other is a bicolor (Green/Amber) LED for status information. The activity LED is driven by the disk drive during normal operation. The bicolor LED is controlled by the SEP device on the backplane. Both LEDs are used to indicate certain conditions under direction of a storage controller.

12.8 Optical Drives

Optical drives are optional in all M610 systems and connect to the blade through the front USB interface. The following internal slim-line drives are available on M610: DVD-ROM and DVD+RW. PATA (IDE) optical drives are not supported.

13 Video (PCI Video)

The Dell™ PowerEdge™ M610 Integrated Dell Remote Access Controller 6 (iDRAC6) incorporates an integrated video subsystem connected to the 32-bit PCI interface of the ICH9. This logic is based on the Matrox® G200 with 8 MB of cache. The device only supports 2D graphics.

The M610 system supports the 2D graphics video modes listed in Table 8.

Table 8. Supported Video Modes

Resolution	Refresh Rate (Hz)	Color Depth (bit)
640 x 480	60, 72, 75, 85	8, 16, 32
800 x 600	56, 60, 72, 75, 85	8, 16, 32
1024 x 768	60, 72, 75, 85	8, 16, 32
1152 x 864	75	8, 16, 32
1280 x 1024	60, 75, 85	8, 16
1280 x 1024	60	32

14 Rack Information

For information on rack and cable accessories for the Dell™ PowerEdge™ M610, see the *PowerEdge M1000e Technical Guide* and the M1000e Rack and Cable Advisor Tool.

15 Operating Systems

The Dell™ PowerEdge™ M610 is designed to meet the Microsoft® WinLogo 3.0 design specifications. For the most up-to-date information, see the Operating System Support Matrix for Dell PowerEdge Systems on Dell.com.

16 Virtualization

16.1 Resources

The Dell Support site has extensive information designed to help you configure virtualization software with PowerEdge servers. For more information, visit the following sites:

- Dell Virtualization Solution Advisor: Advisement for configuring a complete virtualization solution.
- Supported virtualization platforms: Detailed listing of virtualization platforms supported by Dell OpenManage™.
- Dell Support: Other blade-related virtualization documents.

For information about which versions of VMware software have been certified on this server, see the compatibility list maintained by VMware.

It is possible to order the server with an SD card that does not contain ESXi.

16.2 Advanced Infrastructure Manager by Scalent

Dell Advanced Infrastructure Manager (AIM) allows IT organizations to manage networking, storage, and servers (as well as server workloads) that can be dynamically reconfigured and deployed to meet the changing needs of today's data center environment. Specifically, AIM provides IT professionals the ability to:

- Combine new and existing networking, storage devices, and servers into a holistic computing solution that enables dynamic allocation of resources to meet application workload requirements.
- Manage physical and virtual resources with a single solution that includes the ability to move workloads seamlessly across hardware platforms for increased availability and scalability.
- Provide virtualization-like functionality to non-virtual (physical) servers, including automated failover, dynamic load balancing, and business continuity.
- Integrate existing infrastructure (networking, storage devices, and servers) into an AIM solution to provide investment protection and extend the useful life of existing data center assets.
- Significantly decrease the amount of time and people required to deploy hardware and get applications up and running by providing a repeatable, scalable framework for hardware implementation using AIM.

More information can be found at Dell.com/AIM.

16.3 Vizioncore

Vizioncore's easy-to-use virtualization software products support business continuity and disaster recovery, high availability, monitoring, automation, P2V, and optimization. The software is agent-less and can coexist with other leading backup software vendors, or can be used as a standalone solution.

- vRanger™ Pro is a backup and restore solution for virtualized environments.
- vFoglight™ Standard and Professional editions help organizations monitor, understand, and analyze their virtual infrastructure by managing the relationships and interaction between all the components in the virtual environment.

Dell

- vConverter™ helps convert servers to the VMware®, Microsoft®, XenServer™, or Virtual Iron platforms.
- vReplicator is a host-level software-based replication solution for VMware infrastructure which enables companies to leverage virtualization to support High Availability (HA) and Disaster Recovery (DR) strategies.
- Vizioncore™ vOptimizer Pro helps administrators understand storage utilization so they can make real-time adjustments in allocations. It presents the financial impact of reclaimed storage per virtual machine (VM), per host, and cumulative cost savings across the enterprise through historical detailed reports.
- vControl is a VM management solution that provides self-service provisioning, multi-VM control and task-based automation. vControl lets VM consumers build and deploy VMs for themselves, while providing administrators a single interface for task-based administration of VMs.
- Vizioncore vEssentials™ is a software bundle of vFoglight Pro, vRanger Pro and vReplicator.

More information can be found at http://vizioncore.com/asg/.

17 Systems Management

17.1 Overview

Dell delivers open, comprehensive, and integrated solutions that help you reduce the complexity of managing disparate IT assets. Combining Dell™ PowerEdge™ servers with a wide selection of Dell developed systems management solutions gives you choice and flexibility, so you can simplify and save in IT environments of any size. To help you meet your server management demands, Dell offers Dell OpenManage™ systems management solutions for:

- Deployment of one or many servers from a single console
- Monitoring of server and storage health and maintenance
- Update of system, operating system, and application software

Dell offers IT management solutions for organizations of all sizes—priced and sized appropriately, and supported comprehensively.

17.2 Server Management

A Dell Systems Management and Documentation DVD, Dell Management Console DVD, and ISO images are included with the product. See Table 9 for a description of the available content.

Table 9. Server Management Documentation and Information

Title	Description
Dell Systems Build and Update Utility (SBUU)	Assists in OS install and pre-OS hardware configuration and updates.
Server Update Utility (SUU)	Provides an inventory tool for managing updates to firmware, BIOS, and drivers for either Linux or Windows varieties.
OpenManage Server Administrator (OMSA)	Provides a comprehensive, one-to-one (one console to one server) systems management solution, designed for system administrators to manage systems locally and remotely over a network. OMSA allows system administrators to focus on managing their entire network by providing comprehensive one-to-one systems management.
Management Console	Dell IT Assistant (ITA) is also included, as well as tools to allow access to our remote management products. These tools are Remote Access Service for iDRAC and the Baseboard Management Controller (BMC) Utility.
Active Directory Snap-in Utility	Provides an extension snap-in to the Microsoft Active Directory. This allows you to manage Dell specific Active Directory objects. The Dell-specific schema class definitions and their installation are also included on the DVD.
Dell Systems Service Diagnostics Tools	Deliver the latest Dell optimized drivers, utilities, and operating system-based diagnostics that you can use to update your system.
eDocs	Includes PDF files for PowerEdge systems, storage peripherals, and Dell OpenManage™ software.

Title	Description
Dell Management Console (DMC)	Provides a systems management console that enables systems administrators to discover and inventory devices on your network. It provides functions such as health and performance monitoring of networked devices and patch management capabilities for Dell systems. DMC differs from the IT Assistant management console (described above) in that with DMC, value-add plug-ins that enable advanced functionality can be purchased and added to the base DMC product.

17.3 Embedded Server Management

The Dell™ PowerEdge™ M610 circuitry for the next generation of Embedded Server Management. It is Intelligent Platform Management Interface (IPMI) v2.0 compliant. The optional iDRAC (Integrated Dell Remote Access Controller) is responsible for acting as an interface between the host system and its management software and the periphery devices.

The optional upgrade to iDRAC6 provides features for managing the server remotely or in data center lights-out environments.

Advanced iDRAC features require the installation of the optional iDRAC6 Enterprise card.

17.4 Lifecycle Controller and Unified Server Configurator

Embedded management is comprised of interdependent pieces:

- Dell Lifecycle Controller
- Unified Server Configurator
- iDRAC6

Dell Lifecycle Controller powers the embedded management features. It includes integrated and tamper-proof storage for system-management tools and enablement utilities (firmware, drivers, etc.). Lifecycle Controller enables pre-OS server deployment, OS installation, platform updates, platform configuration, and diagnostics capabilities.

Dell Unified Server Configurator (USC) is a graphical user interface (GUI) that aids in local server provisioning in a pre-OS environment. To access the Unified Server Configurator, press the <F10> key within 10 seconds of the Dell logo appearance during the system boot process. Table 10 details current functionality enabled by the USC.

Table 10. Unified Server Configurator Features and Description

Feature	Description
Faster O/S Installation	Drivers and the installation utility are embedded on system, so no need to scour Dell.com.
Faster System Updates	Integration with Dell support automatically directed to latest versions of the Unified Server Configurator, iDRAC, RAID, BIOS, NIC, and power supply.
Update Rollback	Ability to recover to previous “known good state” for all updatable components.
More Comprehensive Diagnostics	Diagnostic utilities are embedded on system.

Feature	Description
Simplified Hardware Configuration	Detects RAID controller and allows user to configure virtual disk and choose virtual disk as boot device, eliminating the need to launch a separate utility. Also provides configuration for iDRAC, BIOS, and NIC/LOM.

17.5 Integrated Dell Remote Access Controller

The integrated Dell Remote Access Controller (iDRAC6) provides IT Administrators comprehensive yet straightforward management of remote servers, by delivering "as if you are there" presence and control. iDRAC6 helps users to save time and money by eliminating travel to the remote server(s), whether that server is located in a different room, a different building, a different city, or in a different country.

iDRAC6 Enterprise is a standard feature on the M610, and Virtual Flash (vFlash) media is a purchasable option.

17.6 iDRAC6 Enterprise

The iDRAC6 Enterprise card provides access to advanced iDRAC6 features. The iDRAC6 Enterprise connects directly to the M610 planar and is mounted parallel to the planar with stand-offs.

Key features for the iDRAC6 Enterprise include:

- Scripting capability with Dell's Racadm command-line
- Remote video, keyboard, and mouse control with Virtual Console
- Remote media access with Virtual Media
- Dedicated network interface

17.7 iDRAC6 Enterprise with Virtual Flash (vFlash) Media

The iDRAC6 Enterprise can be upgraded by adding the vFlash media card. This is an 8 GB Dell-branded SD card that enables a persistent 256 MB virtual flash partition. The vFlash media delivers the following key features:

- Support for 8 GB SD storage media
- Can be used as a repository for a pre-OS image, eliminating the need to maintain a network infrastructure for OS deployment
- Can also be used for permanent diagnostics image for use after system failures, or permanent failsafe image for periodic configuration changes

A more detailed feature list for base management functionality, iDRAC6 Enterprise, and vFlash media is shown in Table 11.

Table 11. Features List for Base Management Functionality, iDRAC, and vFlash Media

Feature	Base Management Functionality	iDRAC6 Enterprise	vFlash Media
Interface and Standards Support			
IPMI 2.0	✓	✓	✓

Feature	Base Management Functionality	iDRAC6 Enterprise	vFlash Media
Web-based GUI		✓	✓
SNMP		✓	✓
WSMAN		✓	✓
SMASH-CLP		✓	✓
Racadm command-line		✓	✓
Conductivity			
Shared/Failover Network Modes	✓	✓	✓
IPv4	✓	✓	✓
VLAN Tagging	✓	✓	✓
IPv6		✓	✓
Dynamic DNS		✓	✓
Dedicated NIC		✓	✓
Security and Authentication			
Role-based Authority	✓	✓	✓
Local Users	✓	✓	✓
Active Directory		✓	✓
SSL Encryption		✓	✓
Remote Management and Remediation			
Remote Firmware Update	✓	✓	✓
Server power control	✓	✓	✓
Serial-over-LAN (with proxy)	✓	✓	✓
Serial-over-LAN (no proxy)		✓	✓
Power capping		✓	✓
Last crash screen capture		✓	✓
Boot capture		✓	✓
Serial-over-LAN		✓	✓
Virtual media		✓	✓
Virtual console		✓	✓
Virtual console sharing		✓	✓
Virtual flash			✓
Monitoring			
Sensor Monitoring and Alerting	✓	✓	✓
Real-time Power Monitoring		✓	✓
Real-time Power Graphing		✓	✓

Feature	Base Management Functionality	iDRAC6 Enterprise	vFlash Media
Historical Power Counters		✓	✓
Logging Features			
System Event Log	✓	✓	✓
RAC Log		✓	✓
Trace Log		✓	✓

17.8 Chassis Management Controller (CMC)

See the *PowerEdge M1000e Technical Guide*.

18 Peripherals

18.1 USB Peripherals

The Dell™ PowerEdge™ M610 supports the following USB devices:

- DVD (bootable; requires two USB ports)
- USB Key (bootable)
- Keyboard (only one USB keyboard is supported)
- Mouse (only one USB mouse is supported)

18.2 External Storage

By use of the appropriate IOMs in the M1000e chassis and mezzanine card(s) in the M610 blade, the following external storage options are available:

- Disk Storage Options:
  - Dell EqualLogic™ PS5000 Series
  - PowerVault™ NX1950 Unified Storage Solution
  - PowerVault MD3000i
- Dell/EMC fibre channel and/or iSCSI external storage, including:
  - CX300
  - CX3-10c
  - CX3-20
  - CX3-40
  - CX3-80
  - CX4-120
  - CX4-240
  - CX4-480
  - CX4-960

Appendix A. Statement of Volatility

The Dell™ PowerEdge™ M610 blade and its configurable modules contain both volatile and non-volatile (NV) components. Volatile components lose their data immediately upon removal of power from the component. Non-volatile components continue to retain their data even after the power has been removed from the component. Dell PowerEdge blades may contain hard disk drives that retain customer data after the system is powered off. Data should be removed from these hard disk drives using locally approved methods before they are removed from a secured environment.

Table 12. PowerEdge M610 Statement of Volatility

BIOS Memory	
Size	4MB
Type	SPI Flash
Can user programs or operating system write data to it during normal operation	No
Purpose	There is boot code and application code. The code is vital to the system booting to the OS. Contains the BIOS code.
How is data input to this memory	Flashed in the factory or using Dell flash utility.
How is this memory write protected	Software write protected
System FRU	
Size	256Kb
Type	Serial I2C EEPROM, nonvolatile
Can user programs or operating system write data to it during normal operation	Yes. A user can enter a username and password which will be stored in the chip.
Purpose	This chip stores some system configuration information (system type, board PPID information, etc)
How is data input to this memory	I2C bus from the iDRAC6
How is this memory write protected	Only the iDRAC6 can write to the chip
CMOS (Complementary Metal-Oxide Semiconductor) Memory	
Size	256 bytes
Type	CMOS
Can user programs or operating system write data to it during normal operation	Using BIOS setup
Purpose	BIOS configurations
How is data input to this memory	BIOS defaults, BIOS setup
How is this memory write protected	NA
Remarks	RTC is inside ICH9. Jumper on motherboard can be used to reset to factory default settings.
LOM (LAN [Network Interface] on Motherboard) Memory	
Size	4Mb (1MB)

Type	Flash
Can user programs or operating system write data to it during normal operation	Yes, under software control.
Purpose	Contains LOM boot code and config data
How is data input to this memory	Requires vendor provided firmware file and loader program used during factory assembly or possible field update. A system loaded with arbitrary data in firmware memory would not operate.
How is this memory write protected	Software control.
Remarks	
Broadcom Integrated LOM Hardware License Key (optional)	
Size	256 Bytes (dual port)
Type	Serial Flash
Can user programs or operating system write data to it during normal operation	No
Purpose	Yes
How is data input to this memory	TOE + iSCSI Offload Licensing
How is this memory write protected	Serial Write through external Interface during factory processes
Size	None
Video Memory	
Size	64M x16
Type	DDR2 SDRAM
Can user programs or operating system write data to it during normal operation	Yes
Purpose	Graphics Buffer
How is data input to this memory	Normal Operation
How is this memory write protected	No
CPLD	
Size	2280 logic elements; 7.5Kbits RAM; 27.6Kbits EBR SRAM
Type	Programmable Logic Device
Can user programs or operating system write data to it during normal operation	Yes (Customer can use DOS program to update CPLD image)
Purpose	Provide blade power sequencing and other blade control logic.
How is data input to this memory	By way of specialized programming utilities used in the factory and possibly for field updates.
How is this memory write protected	Software control.
HDD Backplane Firmware (SEP) Memory	
Size	32KB
Type	Flash
Can user programs or operating system	No. A special (not available to customers)

write data to it during normal operation	DOS utility is needed to flash the application code, and the boot block is cable flashed only.
Purpose	Interface between the RAID controller and the hard drives as well as a controller for the HDD status LED.
How is data input to this memory	Cable flash to flash entire chip or a special utility (not available to customers) to flash in DOS.
How is this memory write protected	Software write protected. No hardware protection pin.
iDRAC6 Enterprise SPI Flash	
Size	2MB
Type	SPI Flash
Can user programs or operating system write data to it during normal operation	No
Purpose	There is boot code that is used by the iDRAC6 Enterprise management controller. Also contains the Life Cycle Log which contains server management data unique to the run-time events of the server itself.
How is data input to this memory	Flashed in the factory or using Dell flash utility. Also written to by the iDRAC6 Enterprise controller to make Life Cycle Log (LCL) entries.
How is this memory write protected	Software write protected
TPM (for boards shipped outside of China; boards sold to destinations in China do not have TPM at this time)	
Size	Unspecified size of user ROM, RAM, EEPROM; 128 bytes of OTP memory included
Type	ROM, RAM, EEPROM
Can user programs or operating system write data to it during normal operation	Yes, OSes and applications that conform to the TCG standard can write data to the TPM during normal operation. Access to the NV Storage is controlled by the TPM owner.
Purpose	Trusted Platform Module NV storage. May be used to securely store user data.
How is data input to this memory	TCG TPM Specification defined command interface.
How is this memory write protected	As defined by the TCG TPM Specification, protection of this NV memory area is configurable by the TPM owner.
iDRAC6 Enterprise Card FRU	
Size	2Kb (256 bytes)
Type	Serial I2C EEPROM, nonvolatile
Can user programs or operating system write data to it during normal	No. A special (not available to customers) DOS utility is needed to flash the

operation	application code.
Purpose	This chip stores some system configuration information (system type, board PPID information, etc)
How is data input to this memory	I2C bus from the iDRAC
How is this memory write protected	Only the iDRAC can write to the chip
iDRAC6 Enterprise Card eMMC	
Size	1GB
Type	NAND Flash
Can user programs or operating system write data to it during normal operation	Yes. Under software control.
Purpose	This device stores the iDRAC6 kernel and other data for system management.
How is data input to this memory	I2C bus from the iDRAC
How is this memory write protected	Only the iDRAC can write to the chip

Appendix B. Certifications

B 1. Regulatory Certifications

Regulatory compliance certificates can be located at the following sites:

- http://www.dell.com/content/topics/global.aspx/about_dell/values/regulatory_compliance/dec_conform?c=us&l=en&s=corp

B 2. Product Safety Certifications

The product has been certified and bears the Mark, as applicable, of the Product Safety authorities as indicated in Table 13.

Table 13. Product Safety Certifications

Country/Region	Authority or Mark
Argentina	IRAM
Belarus	BELLIS
Canada	SCC
China	CNCA or CCC
Croatia	KONCAR
European Union	CE
Germany	TUV
IECEE	IECEE CB
Israel	SII
Kazakhstan	OTAN – CKT
Kenya	KEBS
Kuwait	KUCAS
Mexico	NYCE or NOM
Moldova	INSM
Nigeria	SONCAP
Norway	NEMKO
Russia	GOST
Saudi Arabia	KSA ICCP
South Africa	NRCS
Taiwan	BSMI
Ukraine	UKRTEST or UKRSERTCOMPUTER
United States	NRTL
Uzbekistan	STZ

B 3. Electromagnetic Compatibility

The product has been certified and bears the Mark, as applicable, of the EMC authorities as indicated in Table 14.

Table 14. Electromagnetic Compatibility Certifications

Country/Region	Authority or Mark	Class
Australia/New Zealand	ACMA or C-Tick	Class A
Belarus	BELLIS	Class A
Bosnia & Herzegovina, Montenegro, Serbia	KVALITET	Class A
Canada	ICES	Class A
China	CNCA or CCC	Class A
Croatia	KONCAR	Class A
European Union	CE	Class A
Israel	SII	Class A
Japan	VCCI	Class A
Kazakhstan	OTAN – CKT	Class A
Moldova	INSM	Class A
Norway	NEMKO	Class A
Russia	GOST	Class A
South Africa	SABS	Class A
South Korea	KCC	Class A
Taiwan	BSMI	Class A
Ukraine	UKRTEST or UKRSERTCOMPUTER	Class A
United States	FCC	Class A
Uzbekistan	STZ	Class A
Vietnam	ICT	Class A

B 4. Ergonomics, Acoustics and Hygienics

The product has been certified and bears the Mark, as applicable, of the Ergonomics, Acoustics and Hygienics authorities as indicated in Table 15.

Table 15. Ergonomics, Acoustics and Hygienics

Country/Region	Authority or Mark
Belarus	BELLIS
Germany	GS

Country/Region	Authority or Mark
Russia	GOST

Appendix C. Industry Standards

The Dell™ PowerEdge™ M610 system conforms to the industry standards shown in Table 16.

Table 16. Standards Compliance and Specifications

Standard	URL for information and specifications
ACPI Advance Configuration and Power Interface Specification, v2.0c	http://www.acpi.info/
Energy Star EPA Version 1.0 of the Computer Server specification	http://www.energystar.gov/index.cfm?c=archives.enterprise_servers
Ethernet IEEE 802.3-2005	http://standards.ieee.org/getieee802/802.3.html
IPMI Intelligent Platform Management Interface, v2.0	http://www.intel.com/design/servers/ipmi/
DDR3 Memory DDR3 SDRAM Specification, Rev. 3A	http://www.jedec.org/download/search/JESD79-3A.pdf
LPC Low Pin Count Interface Specification, Rev. 1.1	http://developer.intel.com/design/chipsets/industry/lpc.htm
PCI Express PCI Express Base Specification Rev. 2.0	http://www.pcisig.com/specifications/pciexpress/
PMBus Power System Management Protocol Specification, v1.1	http://pmbus.info/specs.html
SAS Serial Attached SCSI, v1.1	http://www.t10.org/ftp/t10/drafts/sas1/sas1r10.pdf
SATA Serial ATA Rev. 2.6; SATA II, Extensions to SATA 1.0a, Rev. 1.2	http://sata-io.org/
SMBIOS System Management BIOS Reference Specification, v2.6	http://www.dmtf.org/standards/smbios/
TPM Trusted Platform Module Specification, v1.2	https://www.trustedcomputinggroup.org/downloads/specifications/tpm/tpm

Standard	URL for information and specifications
UEFI Unified Extensible Firmware Interface Specification, v2.1	http://www.uefi.org/specs/
USB Universal Serial Bus Specification, Rev. 2.0	http://www.usb.org/developers/docs/
Microsoft® Windows® Logo Windows Logo Program System and Device Requirements, v3.10	http://www.microsoft.com/whdc/winlogo/hwrequirements.mspx